

REMARKS

1. RESPONSE TO CLAIM OBJECTIONS

Claims 14, 26 and 37 have been amended to delete reference to a second claim, thereby obviating the Examiner's objection.

Claims 11, 22-24, 33 and 35 have been amended to overcome the objections raised by the Examiner.

2. REJECTIONS UNDER 35 USC § 112

2.1 Rejections For Alleged Lack Of Written Description

Claims 1-3, 8-13, 16-18, 20-25, 27-29 and 31-36 have been rejection under section 112, first paragraph, for alleged lack of sufficient written description. This rejection is respectfully traversed. Reconsideration and withdrawal thereof are requested.

The Examiner urges that the specification lacks sufficient written description "because the specification does not describe any nucleic acid encoding a sucrose transporter other than that from spinach." But the Examiner then goes on to suggest that "Applicants should submit a list of sucrose transporter sequences known at the time of filing."

In response, enclosed as Annex 1 (with subparts Annex 1.1 through 1.4) are the results of searches carried out in the EMBL and SwissProt databases, to identify sucrose transporter sequences known prior to August 7, 1997, the priority date for filing the present application.

It is noted that these database searches were conducted with four different search terms, namely, "sucrose transporter" (Annex 1.1); "sucrose permease" (Annex 1.2); "sucrose phosphotransferase" (Annex 1.3); and "sucrose symporter" (Annex 1.4). These four terms were

utilized because they are often utilized as synonyms. The interchangeability of these terms can be seen from various entries in one annex which utilized the search term from another annex. For example, the first entry in Annex 1.2 clearly shows the interchangeability of the terms "sucrose transport protein" and "sucrose permease". The second entry of page 4 of Annex 1.2 shows the interchangeability of the terms "sucrose transport protein", "sucrose permease" and "sucrose-proton symporter". Annex 1.3 reports the results utilizing the search term "sucrose phosphotransferase", but a number of the entries show that this term is synonymous with "sucrose permease". Finally the last entry on Annex 1.4 shows that the three terms "sucrose symporter", "sucrose transport protein" and "sucrose permease" are understood to be interchangeable.

Therefore, the results reported in Annexes 1.1 to 1.4 show that at the time of the filing date of the present application a number of sucrose transporter sequences were known to those skilled in the art. As such, the term "sucrose transporters" as utilized in the present claims is indeed fully supported by the written description with the meaning of 35 USC 112, first paragraph.

Accordingly, reconsideration and withdrawal of the rejection are requested.

2.2 Rejection For Alleged Lack Of Enablement

Claims 1-3, 8-13, 16-18, 20-25, 27-29 and 31-36 have been rejected under 35 USC 112, first paragraph, for alleged lack of enablement. This rejection is respectfully traversed.

Similar to the above-noted rejection for lack of written description, the Examiner again urges that "the teaching of one sucrose transporter gene does not enable use of any sucrose transporter gene when other sucrose transporter genes are not taught". However, a number of

sucrose transporter genes were *per se* known in the art at the time of filing of the present application, as evidenced by the results in attached Annexes 1.1 to 1.4. It is not necessary for the present application to include nucleotide sequence information for those *per se* known sequences. That information would be easily accessible to one skilled in the art and compliance with 35 USC 112, first paragraph does not require that the Applicants repeat in the application information which would be well known to those skilled in the art.

The Examiner has also objected to the Applicants attempt to amend the specification at page 3. By means of the present amendment, Applicants have corrected the EMBL accession number "G21319" to correctly refer to "GI: 21319". This correction would be readily apparent to one skilled in the art, and therefore, does not represent new matter. In particular, as noted by the Examiner on page 5 of the Office Action, the incorrect accession number "G21319" actually refers to a human sequence tag cite, which one skilled in the art would recognize is not correct. But a simple search of the NCBI database for the term "sucrose permease" and the number "21319" would readily reveal that the correct accession number "GI: 21319" is indeed a sucrose permease from spinach (see the results from such an NCBI search, attached as Annex 2).

2.3 Rejections Relating To Alleged Indefiniteness

Claims 1-3, 5, 8-13, 16-25 and 27-31 have been rejected under 35 USC 112, second paragraph, for reasons relating to specific claim terminology. The claims have been amended to address and overcome each of the Examiner's objections, so reconsideration and withdrawal of the rejections are requested.

3. PRIOR ART REJECTIONS

Claims 1-2, 5, 8-13, 16-17, 19-25, 27-28 and 30-36 have been rejected under 35 USC 103, of Frommer et al. (U.S. Patent 5,608,146) in view of Kuhn et al.; and claims 3, 18 and 29 have been rejected as being obvious over Frommer et al. in view of Kuhn et al. and further in view of Leggewie et al. (U.S. Patent 6, 025,544).

These rejections are respectfully traversed. Reconsideration and withdrawal thereof are requested.

The Examiner basically urges that since Kuhn et al. teaches the construct comprising the companion cell-specific *rolC* promoter operably linked to a sucrose transporter gene in the antisense orientation having reduced yield, it would be obvious to utilize that promoter in the Frommer et al. construct with a sucrose transporter to get the opposite effect, namely increased yield. Applicants submit that the Examiner's reasoning is faulty, so that the combination of cited references does not properly establish a *prima facie* case of obviousness.

The Examiner recognizes that Kuhn et al. teach use of a *rolC* promoter in an antisense construct resulting in reduced yield. The Examiner assumes that it would then be obvious to one skilled in the art to utilize the same promoter in a sense construct utilizing a sucrose transporter gene to result in increased yield. But this assumption is based upon the faulty premise that this kind of interchanging of a promoter or construct would be reasonably expected by one skilled in the art to achieve the result expected by the Examiner, and publication evidence shows that this would not be the case.

Attached as Annex 4 is a publication by Busch et al. which describes the results of over expression and down regulation experiments with respect to carotenoid biosynthesis in tobacco.

In these experiments, each of three different activities (PSY1, PSY2 and PDS) were over expressed or down regulated by antisense expression, respectively. The results varied in the constructs, and a summary of the results is provided in Annex 5. The key point to be understood from this comparison is that the results obtained from over expressing were not always the opposite of those from antisenseing. For example, on page 2 of Annex 5, it can be seen that antisense expression of PDS led to an increased level of carotenoids; whereas over expression had absolutely no effect. If one were utilize the Examiner's reasoning in the Office Action, one would expect that over expressing PDS should result in decreased level of carotenoids. But the experimental evidence does not substantiate this premise.

Similarly, attached as Annex 6 is a publication from Woo et al which reports the results of over- and antisense expression of UGT1 (UDP-glucuronosyltransferase). Again, the results of these experiments are summarized in Annex 7, showing that over- and antisense expression do not necessarily lead to opposite results. For example, antisense expression of PsUGT1 in pea hairy roots and in alfalfa was lethal; whereas, over expression has no effect in both plant systems. Similarly, antisense expression of 35S-UGT1 in alfalfa plants led to numerous effects; whereas over expression had no effect.

To directly address the Examiner's type of assumption, one will note that Annex 7 summarizes the results of antisense expression of the 35S-UGT1 construct showing that in hairy roots of peas the antisense expression resulted in reduction in plant height as well as delayed flowering, etc., and that in transgenic alfalfa antisense expression resulted in reduced number of floral buds, fewer branches, etc. Following the Examiner's, reasoning over expression of the same gene in alfalfa or in hairy root of peas should result in an increase in those characteristics.

But the experimental evidence reported in the Woo et al. publication shows that the over expression construct had no effect.

Applicants submit, therefore, that the premise of the Examiner's obviousness rejection is faulty, and not consistent with what would be reasonably expected by one skilled in the art. One skilled in the art, knowing that use of promoter in an antisense construct resulted in decreased yield, would not necessarily expect that use of the promoter in a sense construct would result in the opposite characteristic, namely increased yield. One might have been motivated to experiment to see what the results might be from such a construct, but this would merely suggest that it would be "obvious to try" such an experiment. It has long been held that "obvious to try" is not the proper standard for obviousness under 35 USC 103. See In re Deuel, 34 USPQ 2D 1210, 1216 (Fed. Cir. 1995), citing In re O'Farrell, 7 USPQ 2D 1673, 1680-81 (Fed. Cir. 1988).

Since the Examiner's premise for the obviousness rejection has been shown to be improper, that rejection should be withdrawn.

In view of the above, it is believed that the objections raised by the Examiner have been overcome, so that the claims are now in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Leonard R. Svensson (Reg. No. 30,330) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), the Applicant respectfully petitions for a one (1) month extension of time for filing a response in connection with the present application and the required fee of \$110.00 is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 

Leonard R. Svensson, #30,330

LRS/lmt
0147-0191P

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

Attachment(s)